

## **Selection of Screening Categories for Models: Model Uncertainty**

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### **ABSTRACT**

The Chemical Emergency Preparedness and Prevention Office (CEPPO) provides direct support in emission characterization and assessment for emergency situations. For emissions from large-scale disasters, the Office of Air Quality Planning and Standards provides expertise in assessing possible longer-term (chronic) health and ecological risks. Any screening criteria for models must include health effects.

Assessing health effects involves following individuals through their daily activities in order to determine exposures. All other factors being equal, the further from a release, the less attention needs to be given to initial dilution and buoyancy effects. Also, lacking estimates for the mass of emissions released and considering the chaotic interplay of various scales of motion, little can be said beyond where exposures may occur. Results from tracer experiments suggest that at best the uncertainty in estimating the plume's position will be on the order of one quarter of the plume's width in the near field, with larger position uncertainty as the transport distance increases. Having a position uncertainty of this magnitude would result in at least a factor of two in the uncertainty of concentration estimates. There are also uncertainties in characterizing the initial dilution and buoyancy which begs the question, at what level of uncertainty do concentration estimates become worthless?

However, whereas the modeling for a particular event may be highly uncertain, estimates of what might be seen "on average" for this situation may be quite accurate. The difference is whether one is testing a model's ability to replicate the average concentration pattern (assuming one could average observations taken by sampling many realizations taken from the same ensemble) versus testing a model's ability to replicate what might be seen in any one realization.